DanTaet System BB/UK

Supply Water System

User Manual

Scale Factor (**SF**) this system:

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Program 104100 func.spec. 090205

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System Description

DanTaet Supply Water System (System BB-n-UK) is designed for private homes. The system continuously monitors the supply water installation, raising an alarm and cutting off the water supply when the water consumption is abnormally large, or when seepage persists.

The system comprises:
1 pc. Control Unit BB/UK
1 pc. Turbine Flow Meter with Impulse Generator
1 pc. Motor Actuated Ball Valve

Monitoring

Leakage

The system monitors water consumption by means of impulses from the flow meter. The following alarms may be raised during normal operation, causing supply cut-off:

Max. Alarm	If a continuous discharge exceeds 125 / 250 / 500 / 1000 litres (selectable) times the set Scale Factor (**SF**). Refer to front cover of manual for actual scale factor.
Seepage Alarm	On failure to detect a lull of 30 / 60 minutes duration (adjustable) in the water consumption, with 2 / 4 / 8 litres of tolerance (adjustable) within a 24-hour period. The alarm is clock-controlled, and is raised at 18:00 hrs.
Liquid Sensor Alarm (Opt.)	If an attached liquid sensor type LS-X is wet.

System Test

The system is self-testing.
The following system errors may cause alarm and supply cut-off:

Flow Meter Error	Flow meter impulses absent for more than three days.
Valve Error	Flow meter impulses detected while valve is fully closed.
Liquid Sensor Error	An attached liquid sensor type LS-X is non-functional.

Further, the following system errors may raise an alarm:

Power Supply Error	Failure of an internal power supply. The alarm is raised audibly, and the alarm relay activates.
230Vac Error	Mains power failure. Alarm relay activates.

System Operation.

System BB is operated from the front panel, which comprises six state indicators (LEDs) and four keys. Further, a buzzer is present, which provides a brief beep when a key-press is registered, as well as the acoustic alarm signal. Keys and indicators work as follows:

Key ”Reset”	Used to acknowledge and reset alarms. First key-press mutes the audible alarm; second key-press resets the alarm and resumes normal system operation.
Key ”Valve”	Used for manual valve control in normal operating condition. Each successive key-press toggles the valve position. For actual valve position refer to ”Valve” indicator below.
Key ”Unlimited”	Used to select/deselect free discharge with monitor suppression of set duration. Refer to the section ‘Checking and setting the Free time’. The ”Consumption” LED indicates a steady yellow when free discharge is selected.
Key ”Holiday”	Used to activate/deactivate the Holiday function. The ”Consumption” LED indicates a blinking yellow when Holiday function is selected.
Indicator ”Operation”	Overall system state: Green = OK, Red = system error.
Indicator ”Water Meter”	Flashes green when a flow meter impulse is received.
Indicator ”Valve”	Indicates actual valve position: Steady Green = Fully open. Blinking Green = Opening. Steady Red = Fully closed. Blinking Red = Closing.
Indicator ”Max. Alarm”	Indicates the maximum discharge limit is exceeded.
Indicator ”Seepage Alarm”	Indicates absence of 30/60 minute consumption lull for 24 hours.
Indicator ”Consumption”	Indicates activation of a special monitoring state. Steady Yellow = Free discharge. Blinking Yellow = Holiday.

Functional Description / Operating States

The system can assume four different operating states

- Normal Operation
- Operation with disturbance
- Free (unlimited) Discharge
- Holiday
- Alarm State

Normal Operation

Normal operation is characterised by a steady green indication in the ”Operation” and ”Valve” LEDs. The ”Water Meter” LED blinks green in the presence of water consumption, while all other indicators will be extinguished. This is the condition in which the system powers up on delivery. As a rule, the system powers up in the condition in which it was powered down, so that alarm conditions are ’remembered’ through power outages. Normal operation state features the following monitoring functions and settings:

Max. Alarm

The continuous discharge of more than **SF***250 litres (default setting) is not permissible. If this limit is exceeded, an alarm is issued, and the water supply is cut off.
The permissible discharge limit is selectable: 125, 250, 500, or 1000 litres times **SF**.

Seepage Alarm

Within a 24-hour window, a lull in the consumption of at least 30 minutes in which a maximum of 2 litres is used (default setting) is required. If such a lull is not detected, an alarm is issued, and the water supply is cut off. Seepage alarm is controlled by an internal clock, and the alarm, if present, will be raised at 18:00 hours. Possible settings are: 30 or 60 minutes lull duration with maximum tolerance of 2, 4 or 8 litres.

Unlimited

An extraordinary demand for water, e.g. for a car wash, or filling the kids’ outdoor play pool, can be accommodated by pressing the ”Unlimited” key. This key is used for enabling and disabling the discharge monitor. ‘Unlimited’ allows unlimited water consumption for a preset duration one to eight hours, following which normal operation with full monitoring is resumed.
The ”Consumption” LED indicates a steady yellow when Unlimited is selected.

Holiday

The Holiday function should be selected when you leave your house for more than a couple of days. In Holiday mode, the maximum permissible discharge is reduced to 20 litres regardless of setting, and the meter error monitor is suppressed, permitting absence of flow meter impulses for more than three days. Holiday function is toggled by pressing key ”Holiday”, or selected via a signal from a burglar alarm or a door switch. The ”Consumption” LED indicates a blinking yellow when the Holiday function is selected. Note that a Meter Error Alarm may result if you fail to select the Holiday function when leaving the house empty for more than a few days.

Operation with disturbance

Water supply is unimpeded, 'Operation' lamp is yellow following a valve error.

Alarm State

In case of leakage alarm or system error, the system will assume the Alarm state. Alarm state is indicated acoustically using the buzzer, and an alarm relay signals any attached equipment such as e.g. a siren, alarm lamp, or phone dialler.

Three possible leakage alarms exist. For each of these, the "Operation" indicator maintains a steady green, and the cut-off valve is closed, protecting the installation from further leakage.

Max. Alarm

A discharge has exceeded the permissible limit.
Acoustic alarm, and a steady red indication "Max. Alarm"

Seepage Alarm

The system has failed to detect a required lull in the consumption.
Acoustic alarm, and a steady red indication " Seepage Alarm"

Liquid Sensor Alarm (option)

A attached liquid sensor type LS-X is wet.
Acoustic alarm, and steady yellow indications "Max. Alarm" and "Seepage Alarm".
If desired, liquid sensor alarm may be unlinked from the cut-off valve control.

Four possible system errors exist. For each of these, the "Operation" LED changes to red or yellow indication.

Meter Error

The flow meter has failed to issue flow impulses for three days.
Acoustic alarm, and steady yellow indication "Water Meter". The cut-off valve is closed, protecting the installation from leakage during meter error.

Valve Error

The valve is leaky when closed. A flow has been registered during valve cut-off.
Acoustic alarm, and a steady yellow indication "Operation". The cut-off valve remains open.

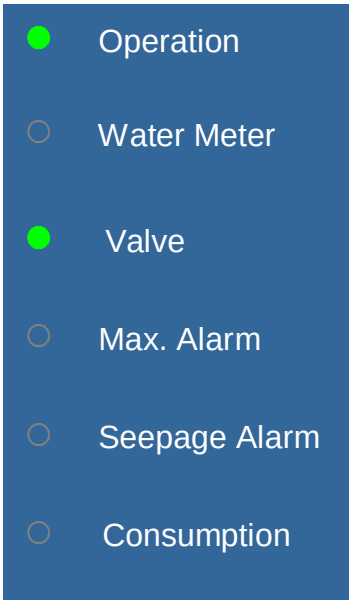
Liquid Sensor Error (option)

An attached liquid sensor has become non-functional.
Acoustic alarm, and steady yellow indications "Max. Alarm", and "Seepage Alarm"; the cut-off valve is closed. Liquid sensor error may be unlinked from the cut-off valve control.

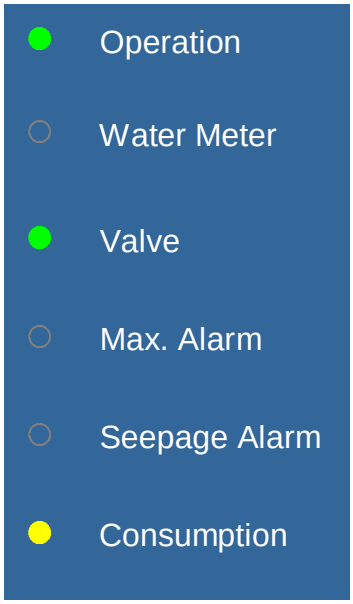
Power Supply Error

An internal power supply has failed.
Acoustic alarm, and a steady red indication "Operation".

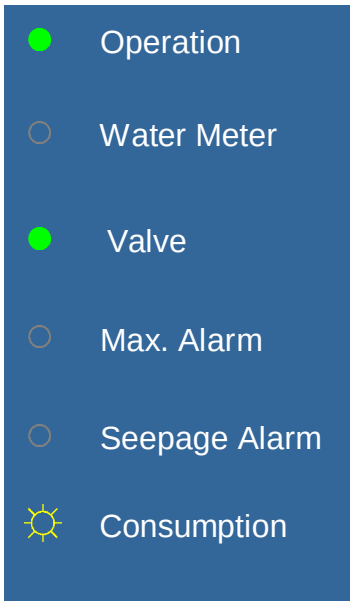
Normal state



Normal monitoring. 'Water meter' flashes green when cold or warm supply water is being used.



Free discharge. Discharge monitor is disengaged for a preset time, indicated by the fixed yellow light in 'Consumption'.



Holiday mode. Allowable discharge limit is reduced. Meter error alarms will not be issued in Holiday mode, which is indicated by a flashing yellow light in 'Consumption'.

In the Normal state, the cut-off valve may be operated manually by the 'Valve' key. Thereby the valve indicator may appear different from the above illustration as described earlier.

Alarm state

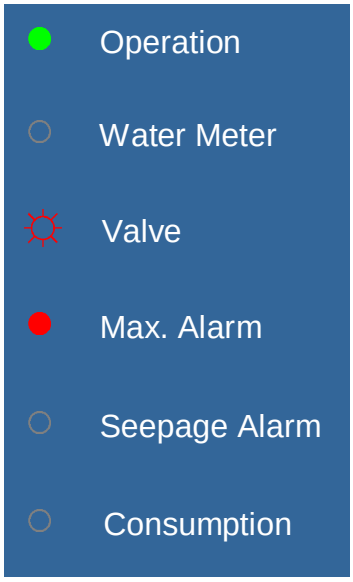
A distinction is made between leakage (abnormal consumption) and system (component failure) errors.
The 'Operation' indicator is green for leakage errors, but changes to red for system errors requiring servicing of the system. All alarms employ audible and visual indication at the front panel; leakage and system errors are further reported on separate signal relays.

The water supply is cut off on leakage errors, and for certain system errors, and may optionally be cut off by an attached (wet) liquid sensor, protecting property and inventory from major water damage.

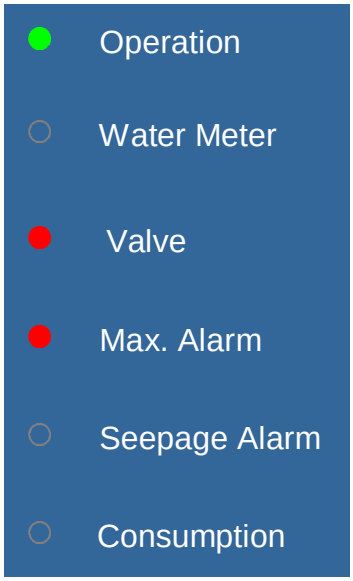
Leakage alarms etc.

Max. Alarm.

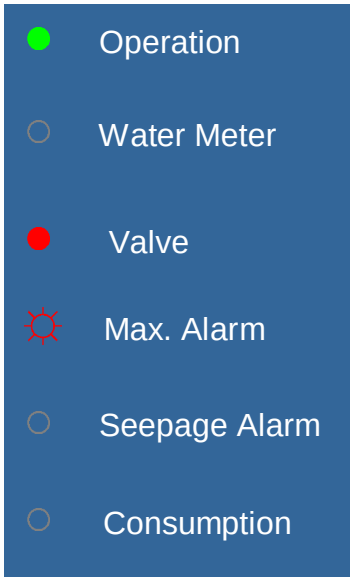
A discharge has exceeded the allowed limit. Audible beep and red light in the 'Max.Alarm' indicator.



Max. Alarm (discharge). Valve is closing, as indicated by the flashing red 'Valve' light.



Max. Alarm (discharge). Valve is now fully closed, as indicated by the fixed red 'Valve' light.

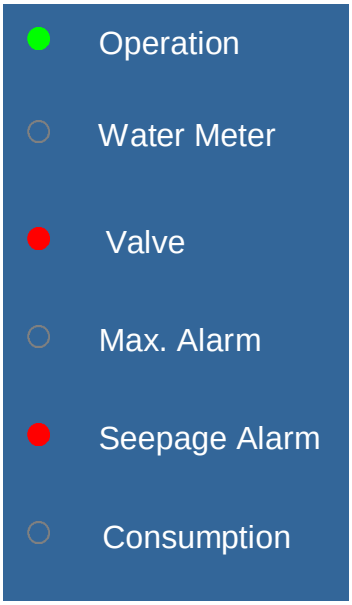


Max. Alarm (discharge),. The audible alarm has been muted by pressing 'Reset' once, indicated by the Max. Alarm indicator flashing red.

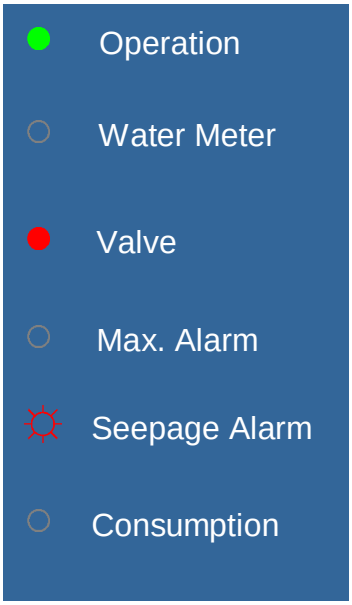
Seepage Alarm.

An idle period in the consumption has failed to materialize in 24 hours. Audible beep and red light in the Seepage Alarm indicator.

Seepage Alarm. The valve is closing, as indicated by the Valve light flashing red.



Seepage Alarm. The valve is not fully closed, as indicated by the fixed red Valve light.

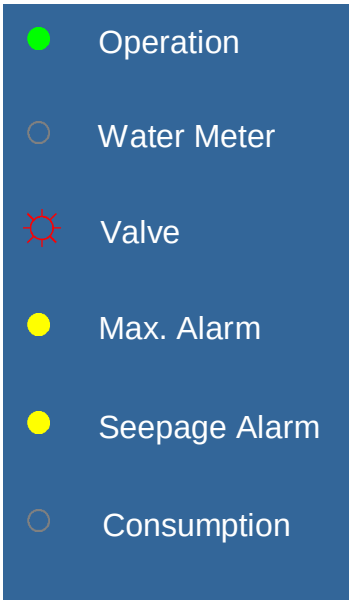


Seepage Alarm. The audible alarm has been muted by pressing 'Reset' once, indicated by the Seepage Alarm indicator flashing red.

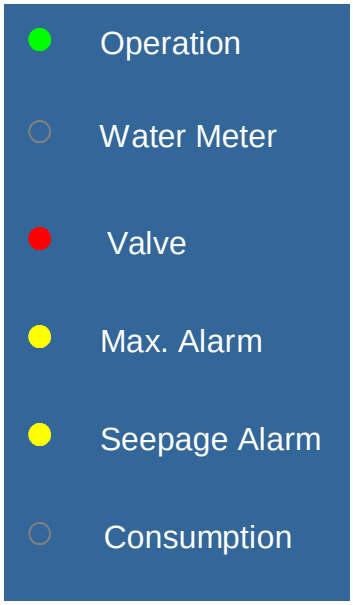
On seepage alarm, the installation should be checked for running toilets, open or untight taps and leakage proper.

Liquid Sensor Alarm (option)**.**

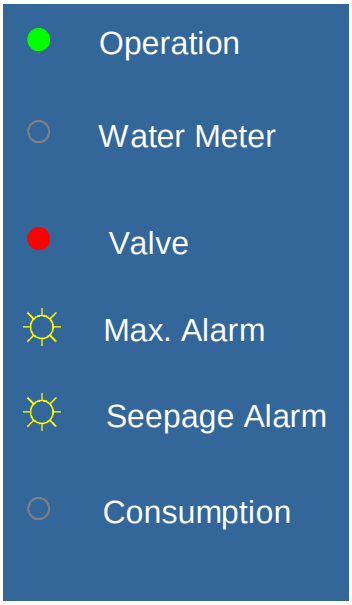
An attached liquid sensor is wet.
Audible beep and yellow light in the ”Max. Alarm” and ”Seepage Alarm” indicators.
Valve cut-off on Liquid Sensor Alarm is optional. In the following example, valve cut-off for Liquid Sensor Alarm is selected..



Liquid Sensor Alarm. The valve is closing, as indicated by the Valve light flashing red.



Liquid Sensor Alarm. The valve is not fully closed, as indicated by the fixed red Valve light.



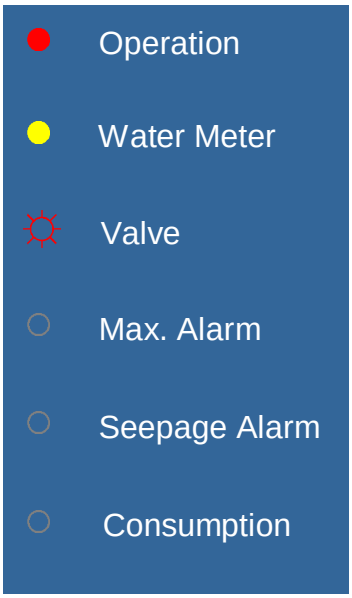
Liquid Sensor Alarm. The audible alarm has been muted by pressing ’Reset’ once, indicated by both alarm indicators flashing yellow.

System Alarms

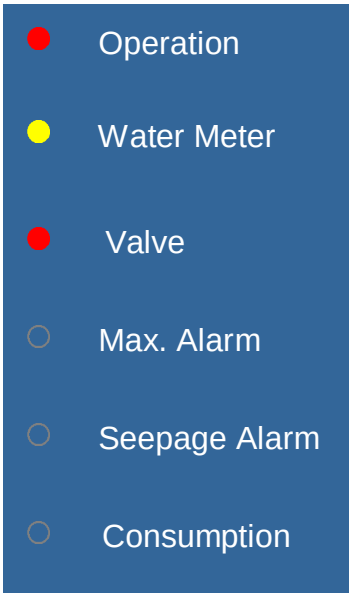
Four system errors are possible. All of these cause the ’Operation’ indicator to change from green to red light.

Meter Error.

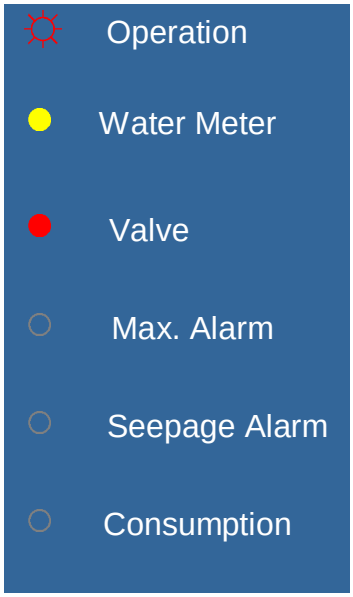
The water meter has not issued any impulses for the last 72 hours. Audible beep and yellow light in the Water Meter indicator; the cut-off valve is closed to protect from leakage from the installation during the error condition.



Meter Error. The valve is closing, as indicated by the Valve light flashing red.



Meter Error. The valve is not fully closed, as indicated by the fixed red Valve light.

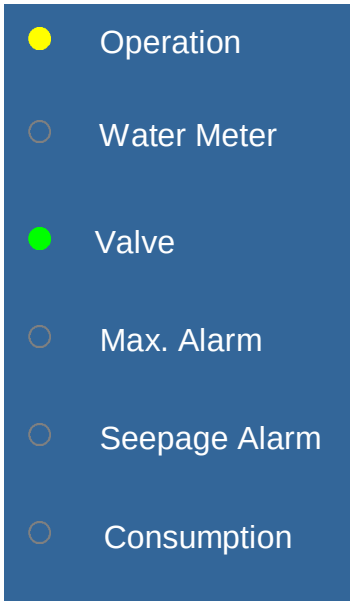


Meter Error. The audible alarm has been muted by pressing ’Reset’ once, indicated by ’Operation’ flashing red.

Meter Error may occur when you forget to put the system in Holiday mode prior to an absence of longer than 72 hours duration. After resetting a Meter Error you must open a tap fully and ascertain that the Water Meter indicator flashes green. If this is not the case, your protection system requires servicing.

Valve Error

The cut-off valve can not shut tight. Consumption was registered with the valve in the closed position. Audible beep, Operation indicator yellow, and cut-off valve open.

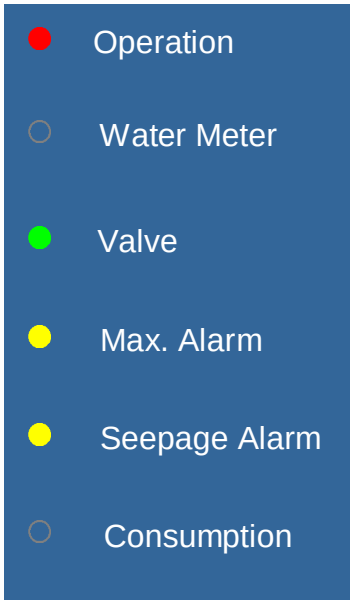


Valve alarm. Valve is open. Audible alarm may be muted by pressing 'Reset' once.

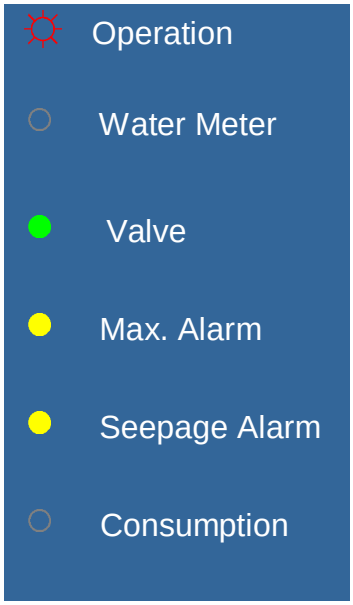
On repeated Valve Errors, the protection system requires servicing.

Liquid Sensor Error (option)**.**

An attached Liquid Sensor is defective.. Audible beep; yellow light in both Alarm indicators. The cut-off valve is not affected.



Liquid Sensor Error. Cut-off valve remains open. The error may also be reported by the signal relays.



Liquid Sensor Error. The audible alarm has been muted by pressing 'Reset' once, indicated by 'Operation' flashing red.

A Liquid Sensor is defective and needs replacement. Contact your supplier for delivery of a new Liquid Sensor. In the meantime, the system may be operated without liquid sensors by removing jumper F4 (refer to the section on Jumper Settings), or by inserting a Dummy into the liquid sensor terminal (refer to the *Electrical Installation* drawing).

Power Supply Error

One of the internal power supplies has developed a defect.
Audible beep and red light in ’Operation’.

Power Supply Error

Power Supply Error. The audible alarm has been muted by pressing ’Reset’ once, indicated by ’Operation’ flashing red.

The system requires servicing.

External Control Input

The system allows a degree of control via an external signal. One of two functions may be assigned to the external control input:

Valve Cut-off

An external signal from e.g. a door switch, or from a burglar alarm system may be used to close the cut-off valve. Cut-off may be instantaneous, or after a two hour delay, permitting a washing machine or dishwasher to finish its cycle.

For instructions, refer to the section Setting the Monitoring Function, jumper row B.

Holiday Function

An external signal from e.g. a door switch, or from a burglar alarm system may be used to activate the Holiday function. This minimises considerably the risk of water damage, since the maximum permissible discharge before alarm/cutoff is just 20 litres.

For instructions, refer to the section Setting the Monitoring Function, jumper row B.

Setting the Monitoring Function

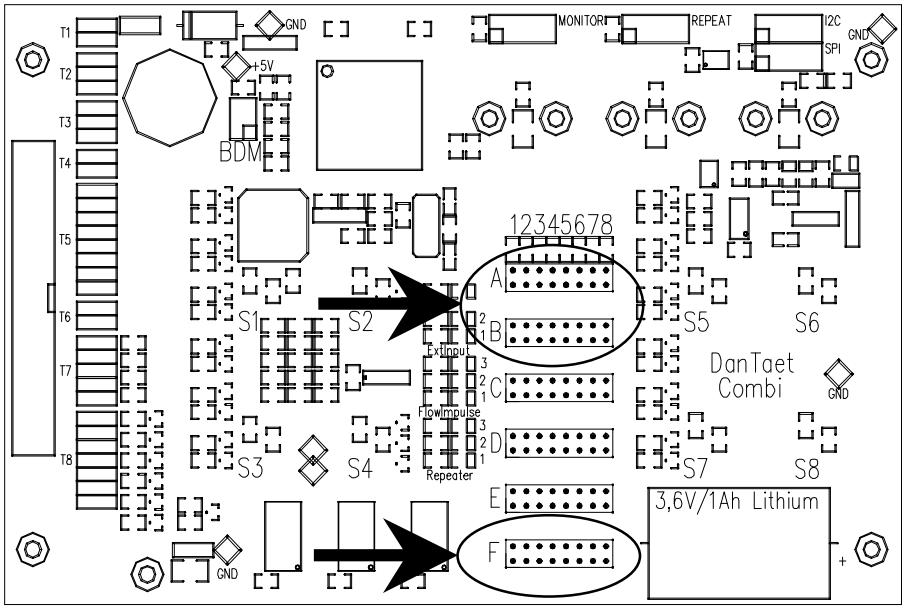
System BB is delivered with pre-set default factory settings, but may be easily adapted to the actual installation by the relocation of jumpers on the circuit board mounted in the lid of the enclosure.
A jumper is a small black plastic clip with an integral metal shunt which will connect two metal pins on the circuit board when inserted over these. A pair of small tweezers or needle-nose pliers may be helpful for the relocation of jumpers.

Jumper (enlarged).
Face and side views.

CAUTION! Disconnect the mains supply before opening the Control Unit enclosure!

Jumper rows A, B and F concern system BB.

Several locations accept no more than one jumper. If too many are installed, or if a jumper is located inappropriately, the system objects by an intermittent beep while on the front panel indicating the number of the problem row by blinking with the corresponding indicator. E.g., blinking the 2nd LED from the top indicates an error in jumper row B.



Settings are changed as follows:

Jumper Row A.

Pos 1: Supply Water monitoring active. **Do not remove this jumper!**

Maximum Discharge Limit

Pos 2: Max Discharge = 125 litres * **SF**.
Pos 3: Max Discharge = 250 litres * **SF**.
Pos 4: Max Discharge = 500 litres * **SF**.
Pos 5: Max Discharge = 1000 litres * **SF**.
Positions 2 to 5 may hold no more than one jumper in all.

Seepage: Tolerance

Pos 6: Seepage Tolerance = 2 litres.
Pos 7: Seepage Tolerance = 4 litres.
Pos 8: Seepage Tolerance = 8 litres.
Positions 6 to 8 may hold no more than one jumper in all.

Jumper Row B.

Seepage: Required Consumption Lull

Pos 1: Duration of consumption lull.
Jumper absent = 30 minutes lull (within 24 hours)
Jumper present = 60 minutes lull (within 24 hours)

External Control Input

Pos 2: Function assignment to input no. 1 (refer to section Electrical Installation)
Jumper absent = Valve Cutoff
Jumper present = Holiday Select

Pos 3: Two hour delay on Valve Cutoff
Jumper absent = Instantaneous action
Jumper present = Action delayed two hours
Positions 2 to 3 may hold no more than one jumper in all.

Meter Configuration (Non-standard meters only)

Pos 4: Meter Impulse Rate: 1 impulse per litre.
Pos 5: Meter Impulse Rate: 2 impulses per litre.
Pos 6: Meter Impulse Rate: 4 impulses per litre.
Positions 4 to 6 may hold no more than one jumper in all.

Pos 7: Meter Impulse Rate: Multiply setting from 4, 5 and 6 by 10.
Pos 8: Meter Impulse Rate: Multiply setting from 4, 5 and 6 by 100.
Positions 7 to 8 may hold no more than one jumper in all.

Jumper Row F (Liquid Sensor Option)

Liquid Sensor Setting

Pos 1: Spare
Pos 2: Spare
Pos 3: Spare
Pos 4: Liquid Sensor Attachment Status
Jumper absent = No Liquid Sensor
Jumper present = Liquid Sensor installed
Pos 5: Liquid Sensor Alarm Relay Function
Jumper absent = Wet alarm not flagged
Jumper present = Wet alarm flagged

Pos 6: Do not use

Pos 7: Liquid Sensor Valve Function
Jumper absent = No valve response on wet sensor
Jumper present = Valve cut-off on wet sensor
Pos 8: Do not use

Liquid Sensor Interface ILS-C.

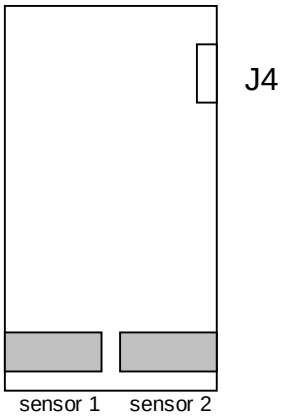
The system can be extended by an ILS-C module, accomodating up to two Liquid Sensors LS-X. Continuous monitoring for:

1:	Dry condition	OK
2:	Wet condition	Alarm: "Liquid Sensor Wet"
3:	Disconnection	Alarm: "Liquid Sensor Fault"
4:	Short circuit	Alarm: "Liquid Sensor Fault"

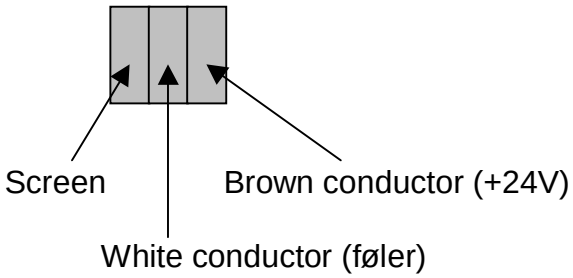
Select number of attached sensors on J4 as shown (near top edge of PCB, close to heatsink) with a jumper:

J4: 1-2 2 liquid sensors attached.

J4: 2-3 1 liquid sensor attached.



The Liquid Sensor cable contains a screened pair (3 connections in all), which must be connected as shown:



Important notice:

1: When one sensor only is attached, you must **use "sensor 1"** .

2: When two sensors are attached, the system cannot determine which sensor is wet or defective. The two sensors are regarded as one, with a common alarm/fault signalling.

Checking and Setting the Clock

System BB is equipped with a real-time clock governing the seepage monitor/alarm. Seepage Alarm time is set to 18:00 hours. The clock automatically selects Daylight Savings Time as appropriate. Slight inaccuracies may accumulate over time; therefore the clock may be checked and set as follows:

Checking the Clock

1. Depress the ”Reset” key for approx. 5 seconds until a series of short beeps begins.
2. Release the key, and all indicators turn green
3. A short beep now sounds for each hour of the clock’s current time.
4. All indicators now turn red.
5. A short beep now sounds for each minute of the clock’s current time.
6. The system reverts to normal operation.

Example:
Green indicators and nine short beeps (nine hours)
Red indicators and 15 short beeps (15 minutes)
The clock’s time is 9:15

Setting the Clock

1. Depress the ”Reset” key for approx. 5 seconds until a series of short beeps begins.
2. Whils system beeps, release the key briefly, and depress again for 5 seconds.
3. Upper indicator turns green; clock setting must commence within 6 seconds. (The green light progresses down one indicator every second).
4. Clock hours are set first: Press key ”Reset” once for each hour the clock must read.
5. Next, let the green light progress through the bottom indicator
6. Upper indicator turns red; minutes setting must commence within 6 seconds. (The red light progresses down one indicator every second).
7. Minutes are set next. Press key ”Reset” once for each minute the clock must read.
8. Next, let the red light progress through the bottom indicator
9. The system reverts to normal operation.

Checking and setting the Free time

The duration for which the discharge monitor is suppressed after activating the ’Unlimited’ key can be set from one to eight hours from the front panel.

Checking the Free time

1. Depress ’Unlimited’ key for 5 seconds until a series of short beeps begins.
2. Release the key, and all indicators turn green
3. A short beep now sounds for each hour of suppression duration
4. The system reverts to normal operation.

Example:
Green indicators and 3 short beeps (three hours)
Discharge monitor is suppressed for three hours by activation of ’Unlimited’’.

Setting the Free time

1. Depress ’Unlimited’ key for 5 seconds until a series of short beeps begins.
2. While system beeps, release the key briefly, and depress again for 5 seconds.
3. Upper indicator turns green; Free time setting must commence within 6 seconds. (The green light progresses down one indicator every second).
4. Press ’Unlimited’ once for each hour of desired Free time.
5. Next, let the green light progress through the bottom indicator
6. The system reverts to normal operation..

Functional Verification

To make sure the system works as expected, we recommend performing a functional verification annually.

Functional Verification Leakage Alarm

Functionality is verified as follows:

1. Activate the ”Holiday” key, causing yellow blinking of indicator ”Consumption”.
2. Open a faucet, discharging approx. 20 litres of water.
3. The Control Unit must enter the Alarm state and cut off the water supply.
4. Now check the cutoff valve closes tight. (Water must cease coming from the faucet)
5. If the valve closes tight, reset the alarm, and activate the ”Holiday” key again, causing extinction of indicator ”Consumption”.
6. Water should resume coming from the faucet, and the Control Unit must enter the normal operating state.
7. Close the faucet: functional verification is complete.

Functional Verification Liquid Sensor (option)

Functionality is verified as follows:

1. Disconnect mains power and check the jumper configuration of the liquid sensor (refer to the manual section titled Setting the Monitoring Function).
2. Reconnect mains power and excite the Liquid Sensor using a moist rag.
3. The Control Unit must enter the alarm state, and close the cutoff valve if configured to do so.
4. Remove the rag from the Liquid Sensor. Wipe dry if necessary. The Control Unit must revoke the alarm and resume normal operation.

Installation Instructions - plumbing

Supply Water Installation

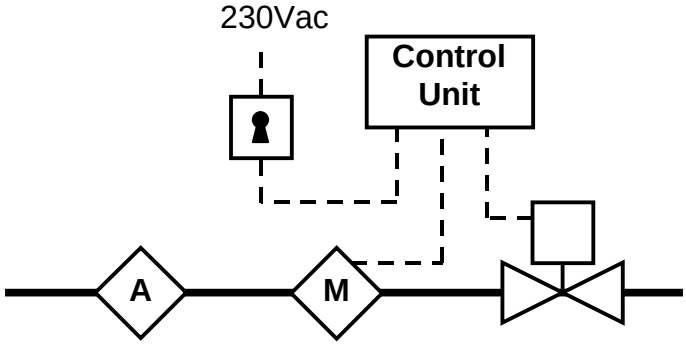
Meter and valve are installed as illustrated.
Note that valve and in particular meter are both sensitive to impurities.
Installation of a filter upstream of meter and valve significantly enhances their lifetime expectancy, and is highly recommended. Meter and valve defects attributable to impurities in the water are void of warranty.

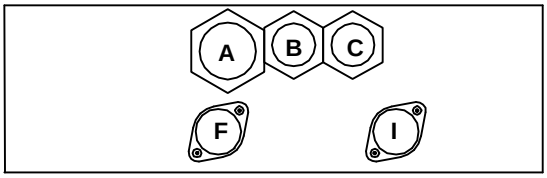
Meter

Turbine meter with impulse generator. Orientation must be horizontal with dial facing upwards.

Cut-off Valve

Motor-actuated ball valve, 24Vac supplied by the Control Unit. Orientation may be horizontal or vertical, except the actuator must not hang directly below the valve body.

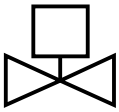




A: 230Vac
B: Liquid Sensor PG9
C: Alarm Relay PG9
F: Cutoff valve
I: Flow meter

Legend:

Billing Meter



Motor Actuated Ball Valve

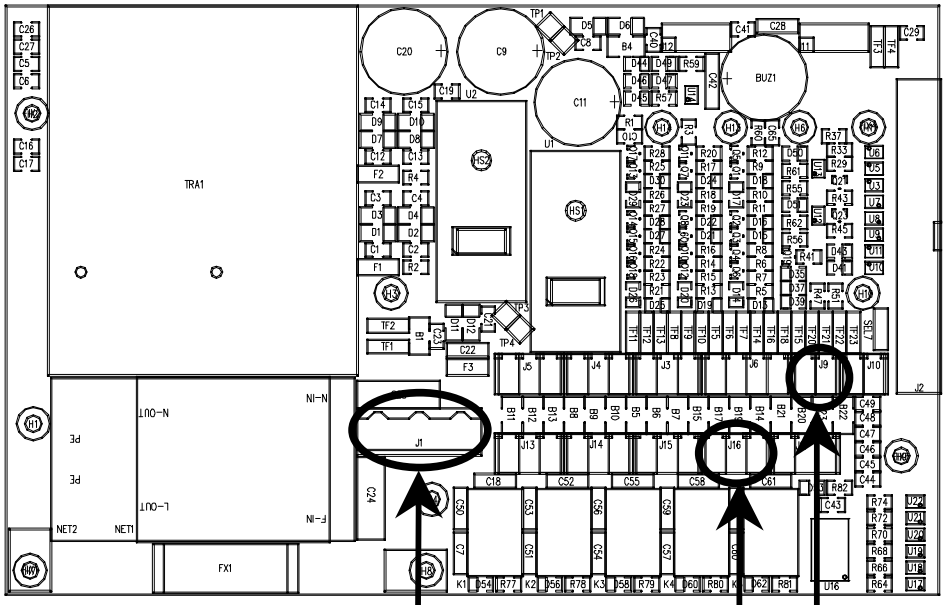
System BB Flow Meter

Key Switch 230Vac

Electrical Installation

Meter and valve are connected to the Control Unit by means of the attached plugs.

Wiring to the Mains Supply, External Control Input and Remote Alarm Output is shown in the following illustration.



Mains Supply
230Vac PE - N - L

Alarm Output
One fail-safe alarm relay is provided.
Floating SPDT, energized in the normal condition.
Alarm Relay J16: Max. 24Vac NC-COM-NO

External Control Input
One digital input is provided.
Input J9: Internal supply 12Vdc Valve Cut-off/Holiday
Activating (shorting) this input causes valve cut-off, or activates the Holiday function, depending on jumper in Row B, positions 2 and 3.

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EU-Overensstemmelseserklæring

ifølge retningslinierne 89/336/EØF og 73/23/EØF

EU Declaration of Conformity

in accordance with the following directives 89/336/EEC and 73/23/EEC

*DanTaet Electronics a/s erklærer hermed at **System Brugsvand Basic (System BB)** er fremstillet i overens-stemmelse med ovennævnte direktiver samt i henhold til følgende standarder:*

*DanTaet Electronics a/s hereby declare that the **System Brugsvand Basic (System BB)** has been designed and manufactured in conformity with the above Directives and in accordance with the following standards:*

EMC

Immunitet / Immunity
DS/EN 61000-6-1:2002, DS/EN 61000-6-2:2002

Emission
DS/EN 61000-6-3:2002, DS/EN 61000-6-4:2002

Sikkerhed / Safety

DS/EN 61010-1:2001

Det er en forudsætning at DanTaet Electronics a/s installationsvejledninger er fulgt.

It is on condition that DanTaet Electronics a/s guideline for installations is followed.

Odense, 25. maj 2004

Erik Nielsen
Adm. direktør / President
DanTaet Electronics a/s